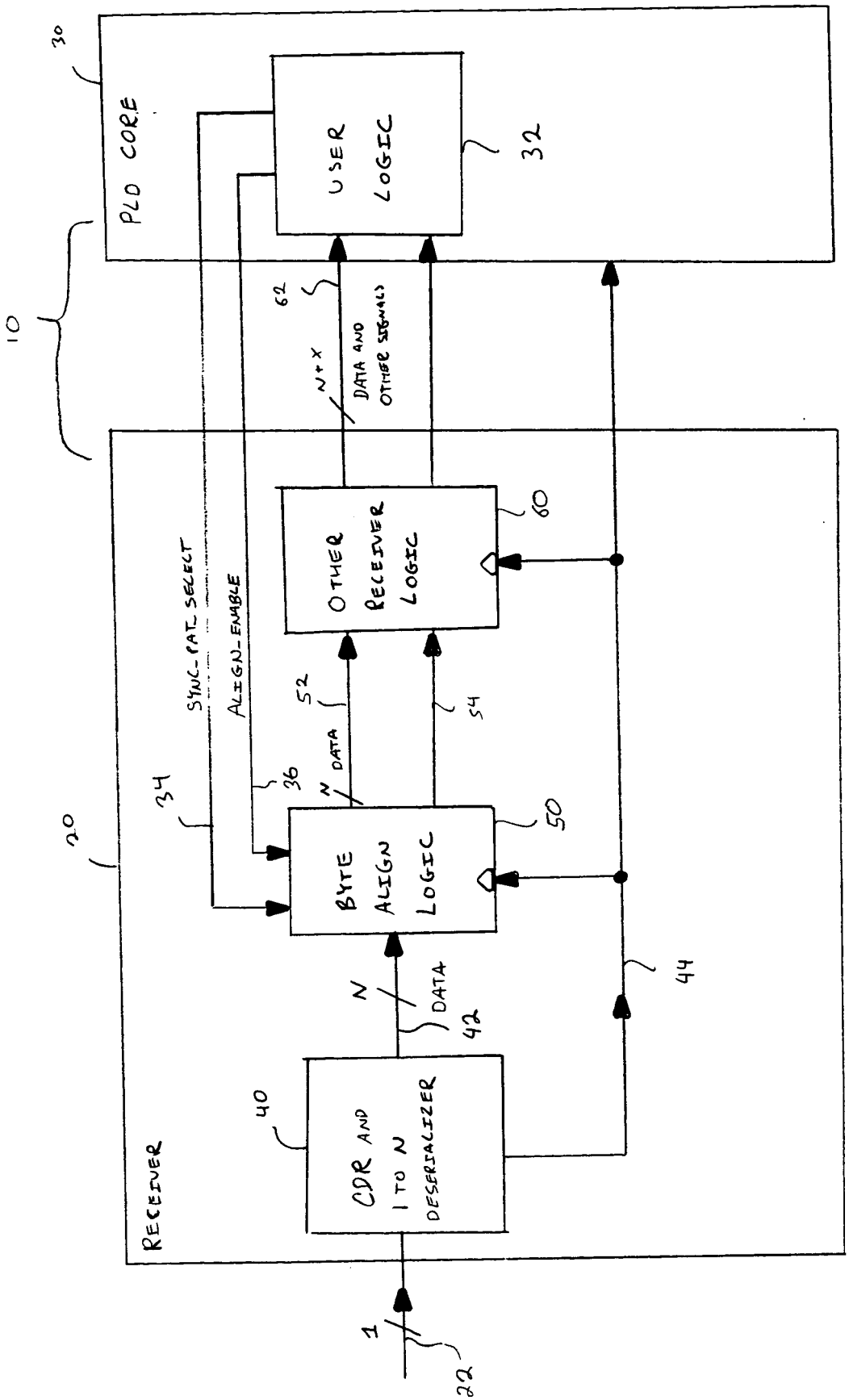
30
PLD CORE
USER LOGIC
32
10
62
N+X
DATA AND OTHER SIGNALS
OTHER RECEIVER LOGIC
60
SYNC_PAT_SELECT
ALIGN_ENABLE
52
54
N DATA
36
34
20
BYTE ALIGN LOGIC
50
N
DATA
42
44
40
CDR AND 1 TO N DESERIALIZER
RECEIVER
1
22

FIG. 1

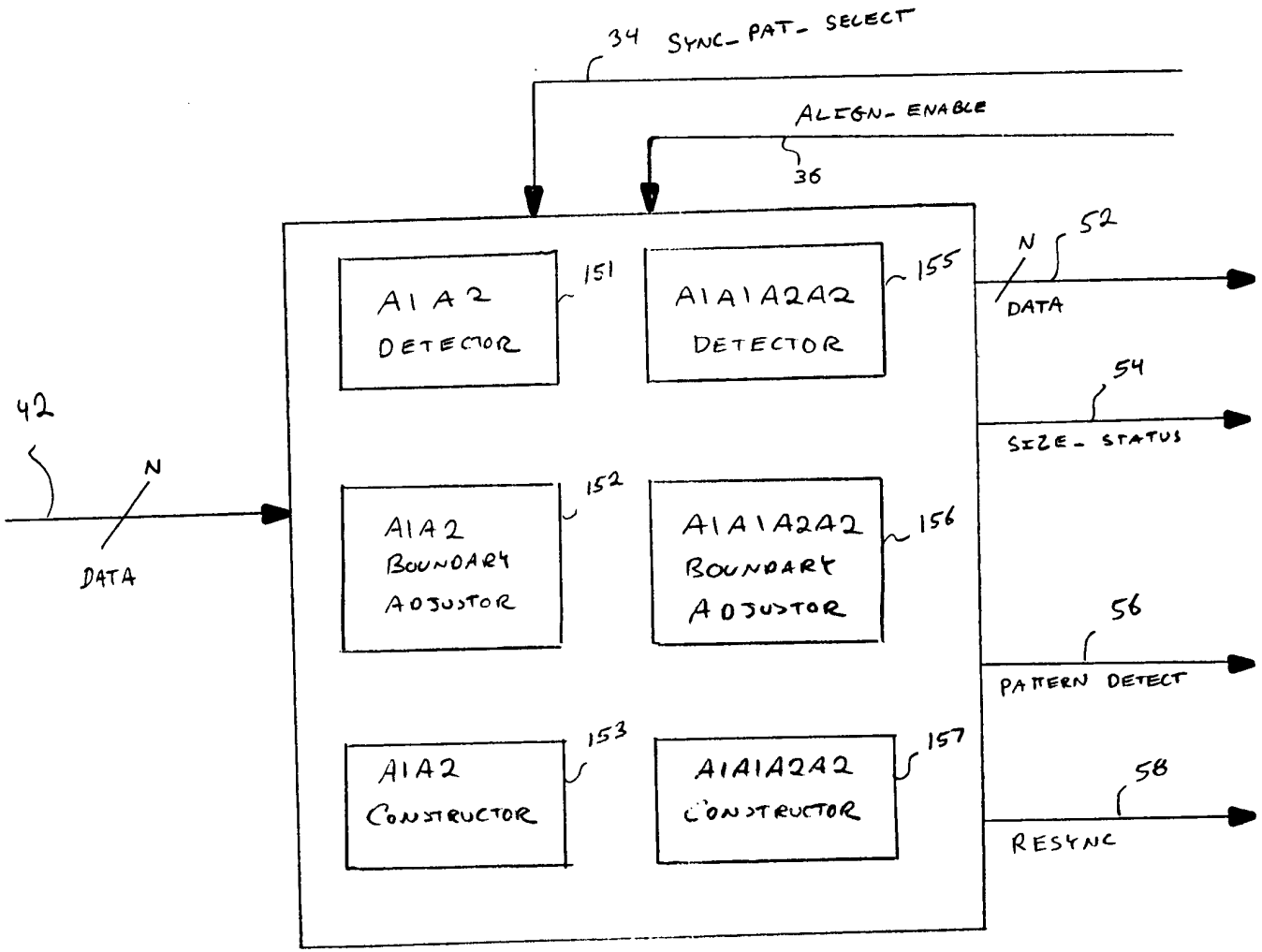
34 SYNC_PAT_SELECT
ALIGN_ENABLE
36
42
N
DATA
A1A2 DETECTOR
151
A1A1A2A2 DETECTOR
155
A1A2 BOUNDARY ADJUSTOR
152
A1A1A2A2 BOUNDARY ADJUSTOR
156
A1A2 CONSTRUCTOR
153
A1A1A2A2 CONSTRUCTOR
157
N
52
DATA
54
SIZE_STATUS
56
PATTERN DETECT
58
RESYNC

FIG. 2

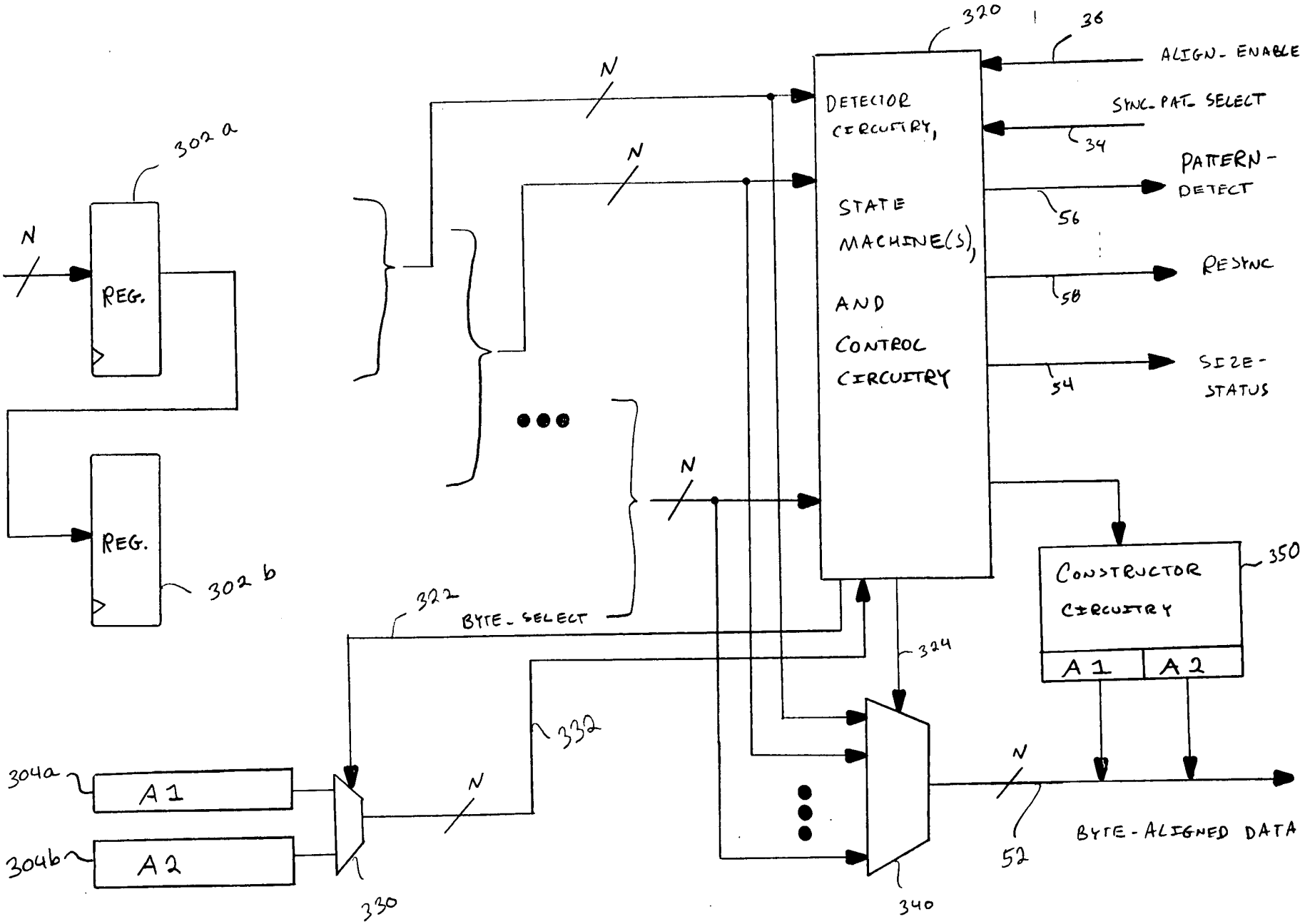
320
36
ALIGN-ENABLE
DETECTOR CIRCUITRY,
SYNC-PAT-SELECT
34
STATE MACHINE(S),
PATTERN-DETECT
56
AND
CONTROL CIRCUITRY
RESYNC
58
SIZE-STATUS
54
N
302a
REG.
302b
322
BYTE-SELECT
324
CONSTRUCTOR CIRCUITRY
350
A1
A2
304a
304b
332
330
340
52
BYTE-ALIGNED DATA

FIG. 3

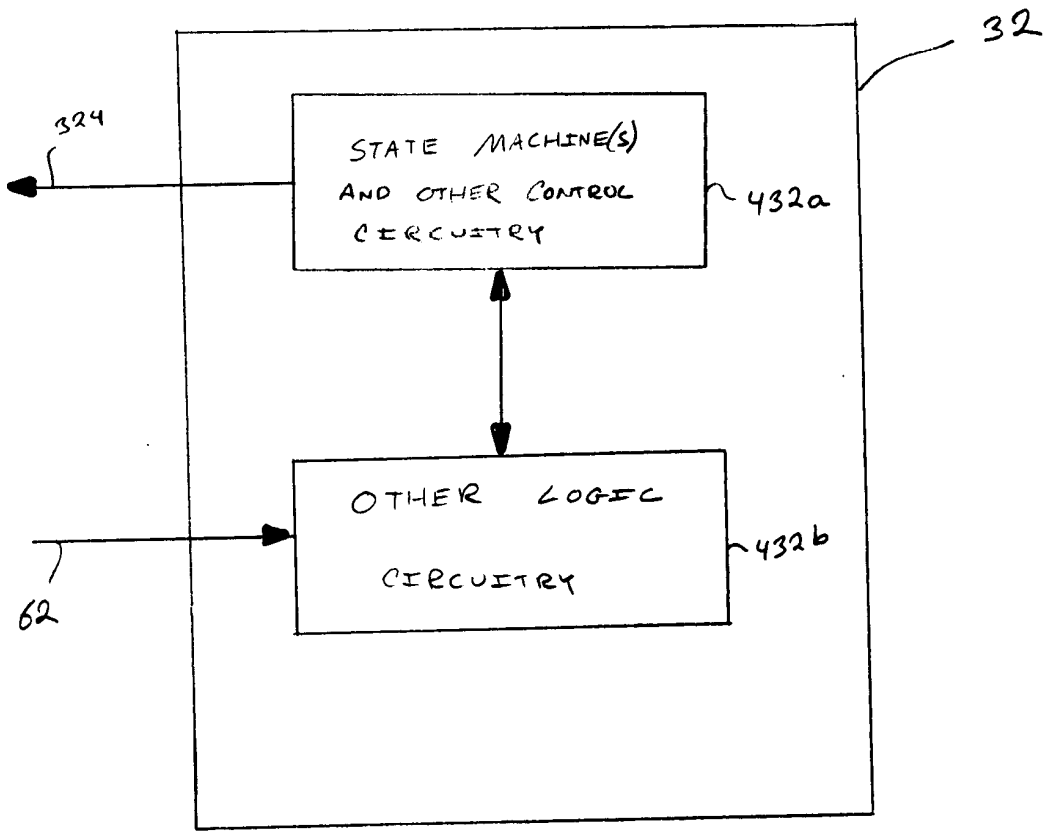
32
324
STATE MACHINE(S) AND OTHER CONTROL CIRCUITRY
432a
OTHER LOGIC CIRCUITRY
432b
62

FIG. 4

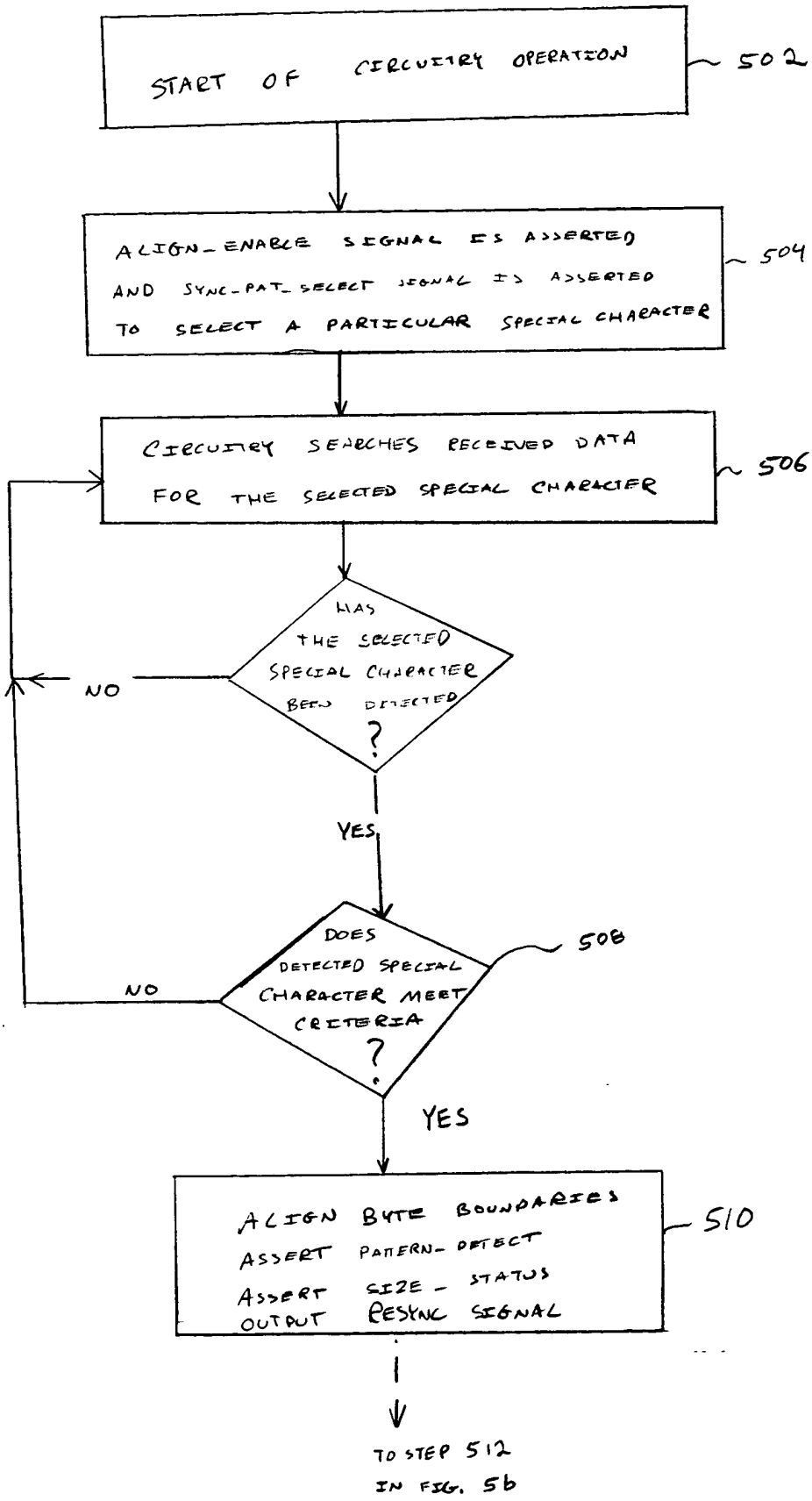
START OF CIRCUITRY OPERATION
502
ALIGN_ENABLE SIGNAL IS ASSERTED AND SYNC_PAT_SELECT SIGNAL IS ASSERTED TO SELECT A PARTICULAR SPECIAL CHARACTER
504
CIRCUITRY SEARCHES RECEIVED DATA FOR THE SELECTED SPECIAL CHARACTER
506
HAS THE SELECTED SPECIAL CHARACTER BEEN DETECTED ?
NO
YES
DOES DETECTED SPECIAL CHARACTER MEET CRITERIA ?
508
NO
YES
ALIGN BYTE BOUNDARIES
ASSERT PATTERN_DETECT
ASSERT SIZE_STATUS OUTPUT
RESYNC SIGNAL
510
TO STEP 512 IN FIG. 5b

FIG. 5a

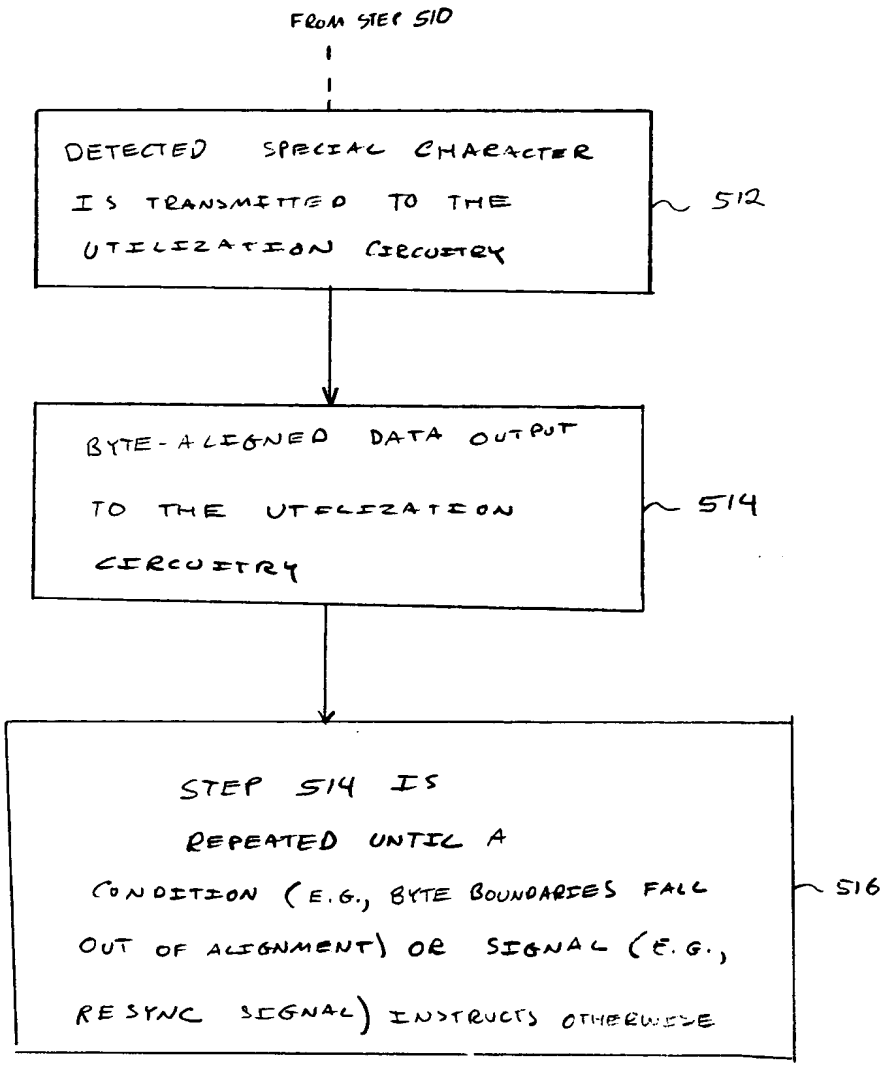
FROM STEP 510
DETECTED SPECIAL CHARACTER IS TRANSMITTED TO THE UTILIZATION CIRCUITRY
512
BYTE-ALIGNED DATA OUTPUT TO THE UTILIZATION CIRCUITRY
514
STEP 514 IS REPEATED UNTIL A CONDITION (E.G., BYTE BOUNDARIES FALL OUT OF ALIGNMENT) OR SIGNAL (E.G., RESYNC SIGNAL) INSTRUCTS OTHERWISE
516

FIG. 5b

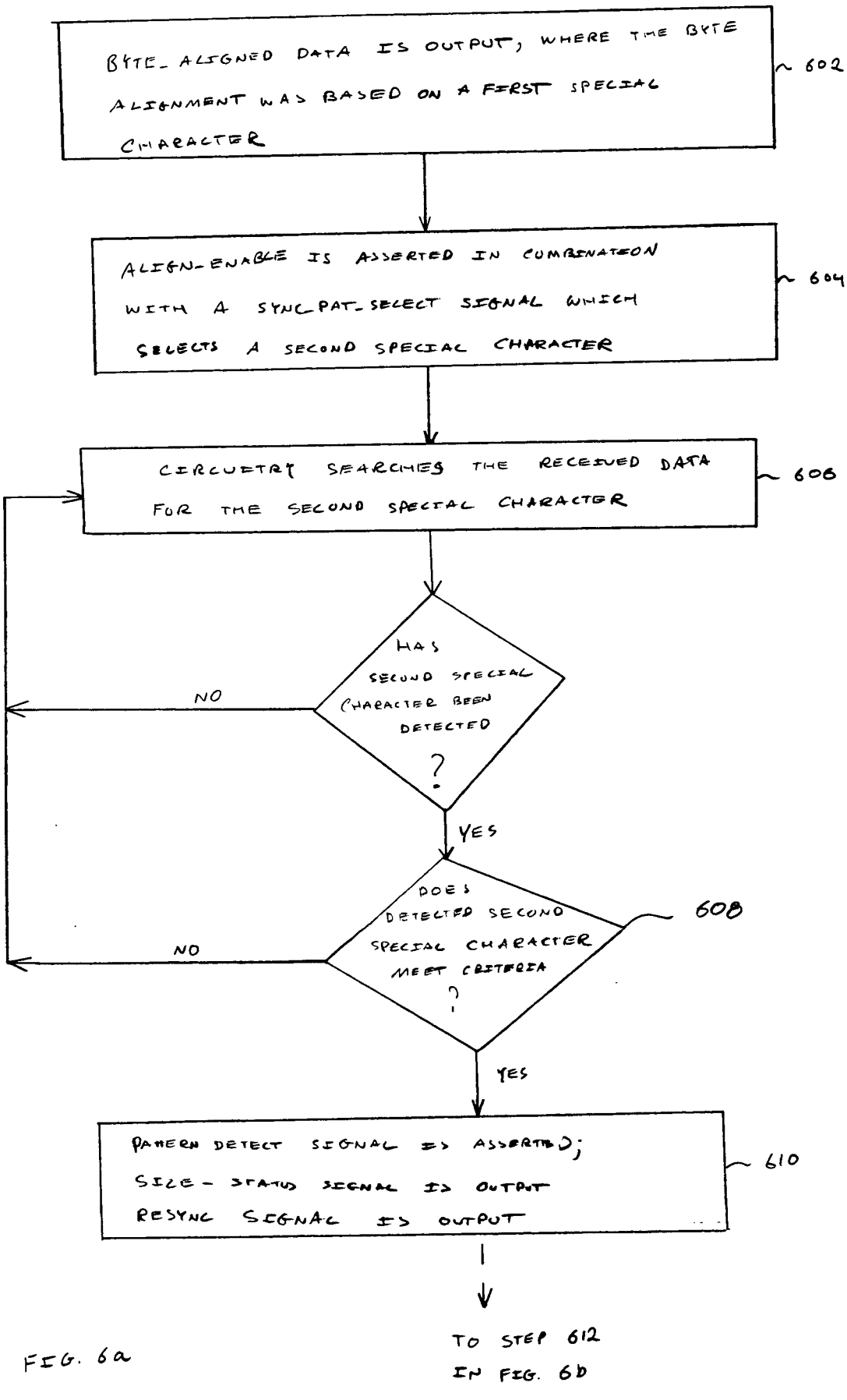
BYTE_ALIGNED DATA IS OUTPUT, WHERE THE BYTE ALIGNMENT WAS BASED ON A FIRST SPECIAL CHARACTER
602
ALIGN_ENABLE IS ASSERTED IN COMBINATION WITH A SYNC_PAT_SELECT SIGNAL WHICH SELECTS A SECOND SPECIAL CHARACTER
604
CIRCUITRY SEARCHES THE RECEIVED DATA FOR THE SECOND SPECIAL CHARACTER
606
HAS SECOND SPECIAL CHARACTER BEEN DETECTED ?
NO
YES
DOES DETECTED SECOND SPECIAL CHARACTER MEET CRITERIA ?
608
NO
YES
PATTERN DETECT SIGNAL IS ASSERTED; SIZE_STATUS SIGNAL IS OUTPUT RESYNC SIGNAL IS OUTPUT
610
TO STEP 612 IN FIG. 6b

FIG. 6a

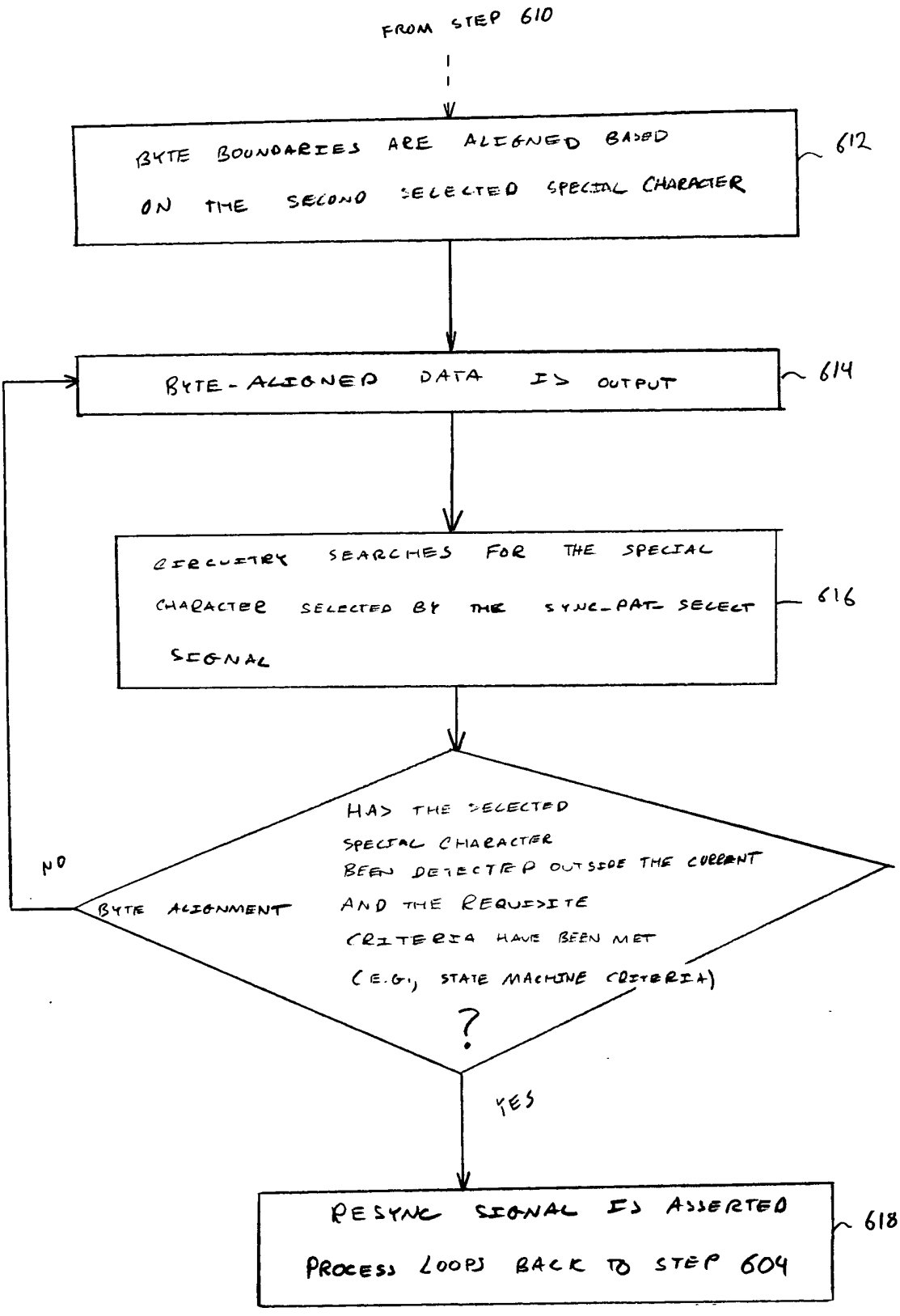
FROM STEP 610
BYTE BOUNDARIES ARE ALIGNED BASED ON THE SECOND SELECTED SPECIAL CHARACTER
612
BYTE-ALIGNED DATA IS OUTPUT
614
CIRCUITRY SEARCHES FOR THE SPECIAL CHARACTER SELECTED BY THE SYNC_PAT SELECT SIGNAL
616
HAS THE SELECTED SPECIAL CHARACTER BEEN DETECTED OUTSIDE THE CURRENT BYTE ALIGNMENT AND THE REQUISITE CRITERIA HAVE BEEN MET (E.G., STATE MACHINE CRITERIA)
?
NO
YES
RESYNC SIGNAL IS ASSERTED
PROCESS LOOPS BACK TO STEP 604
618

FIG. 6b

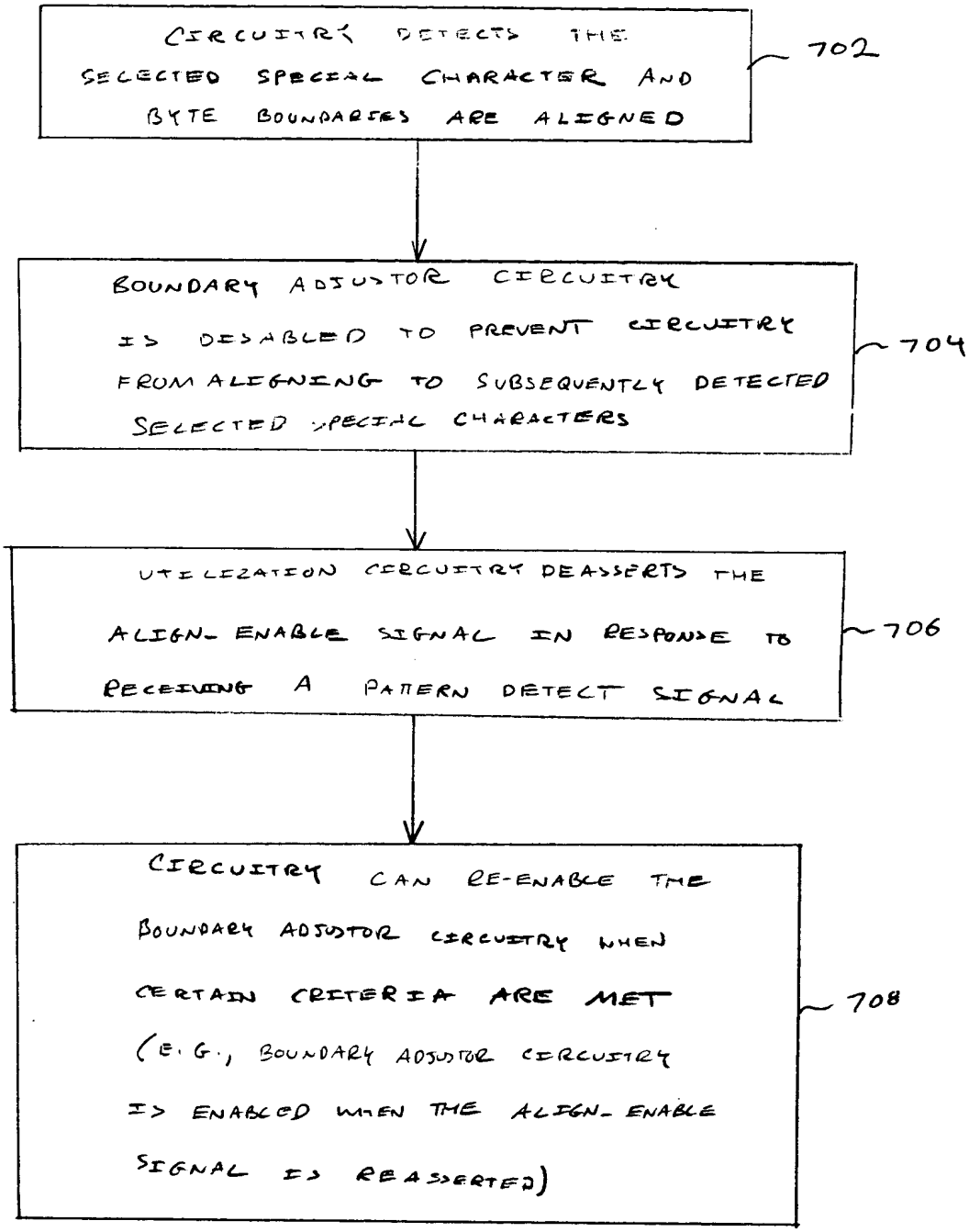
CIRCUITRY DETECTS THE SELECTED SPECIAL CHARACTER AND BYTE BOUNDARIES ARE ALIGNED
702
BOUNDARY ADJUSTOR CIRCUITRY IS DISABLED TO PREVENT CIRCUITRY FROM ALIGNING TO SUBSEQUENTLY DETECTED SELECTED SPECIAL CHARACTERS
704
UTILIZATION CIRCUITRY DEASSERTS THE ALIGN_ENABLE SIGNAL IN RESPONSE TO RECEIVING A PATTERN DETECT SIGNAL
706
CIRCUITRY CAN RE-ENABLE THE BOUNDARY ADJUSTOR CIRCUITRY WHEN CERTAIN CRITERIA ARE MET (E.G., BOUNDARY ADJUSTOR CIRCUITRY IS ENABLED WHEN THE ALIGN_ENABLE SIGNAL IS REASSERTED)
708

FIG. 7

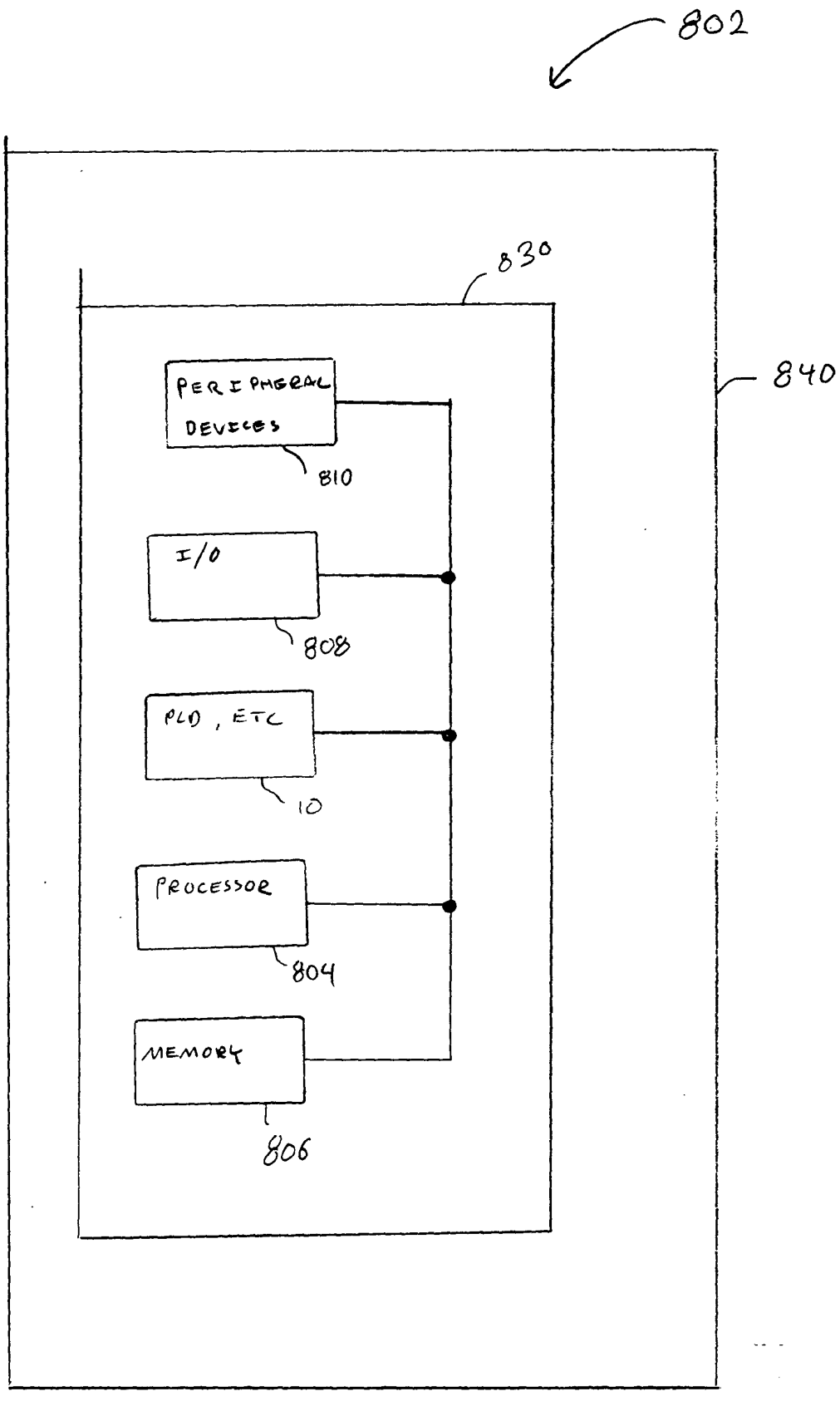
802
830
840
PERIPHERAL DEVICES
810
I/O
808
PLD, ETC
10
PROCESSOR
804
MEMORY
806

FIG. 8